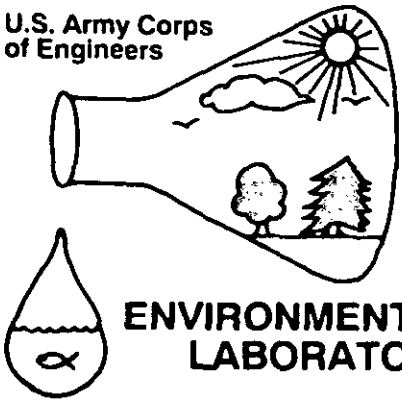


Hubbardston MA 01452

Analytical Data Report

HOPKINTON WELLS

U.S. Army Corps of Engineers
New England Division
Environmental Laboratory
Hubbardston, MA 01452

Date: December 14, 1992

Brian J. Condike
Chief, Environmental Laboratory

TABLE OF CONTENTS

1. Case Summary

HOPKINTON WELLS

1. Environmental Laboratory personnel collected twelve water samples for the above subject project on 21 September 1992 and 23 September 1992. These samples were received at the laboratory on 22 September 1992 and 23 September 1992. Standard USEPA methods were employed for sampling and sample preservation. Copies of the chain-of-custody records are enclosed for reference, along with a list of the samples collected.

2. The following analyses were performed in-house:

Analysis	EPA Method
Water samples	
Carbon Dioxide	Standard Method 4500-CO2 D**
Fuel Identification	^
Total Dissolved Solids	Standard Method 209C*
Alkalinity	Standard Method 2320**
pH	9040
Chloride	300
Sulfide	300
Calcium	3015/6010
Iron	3015/6010
Magnesium	3015/6010
Manganese	3015/6010
Hardness	Standard Method 2340B**

3. Our validated contractor laboratory performed the following analysis:

Sulfide	376.2

^ - Proposed Practice Oil Spill Source Identification by Combined Gas Chromatography and Positive Ion Electron Impact Low Resolution Mass Spectrometry, ASTM, Draft 1, Jan., 1991.

Contaminated Soils - Diesel Fuel Contamination, written by Paul T. Kostecki and Edward Calabrese, Chapter 1 - The Use of Hydrocarbon Analyses for Environmental Assessment and Remediation, Lewis Publishers, Chelsea, Michigan, 1991.

* - Standard Methods, 1986, 16th Edition
** - Standard Methods, 1989, 17th Edition

2. Field Notes

PROJECT: HOPKINTON DAM RELIEF WELL STUDY

DATE: 21 SEPT 92

COLLECTOR(S): AMIDON, MILLER

SAMPLE #	FIELD DESCRIPTION STATION	TIME	D.O.	pH	SAMPLE DEPTH	COMMENTS
18382	RW-1	1456	2.4	7.1	55'	17 FEET TO WATER SURFACE
18383	RW-2	1414	3.2	6.1	55'	
18384	RW-3	1357	4.0	6.3	55'	
18385	RW-4	1339	3.8	7.6	55'	
18386	RW-5	1140	4.8	7.6	55'	*
18391	POOL-1	1259	7.0	5.9	5'	
18387	RW-6	1117	3.9	7.2	55'	
18388	RW-7	1048	4.1	6.7	55'	*
18389	RW-8	1024	3.0	6.7	55'	
18390	RB-1	1505				
18392	BLANK	0700				

REMARKS: Well water samples to be collected 55' from top of well; pool water sample at 5' below water surface.

* Well #7 - a small very viscous slug of petroleum product was pulled through line from this well. No odor at well head but H.C. odor of product is in sample.
Well #5 - as above, but smell is noted at well and after sampling a film is evident on surface of water in well, and product is liquid.

3. Sample Listing

HOPKINTON WELLS
SAMPLE LISTING

ENV NO.	FIELD DESCRIPTION	SAMPLE DATE	MATRIX
18382	RW-1	9/21/92	WATER
18383	RW-2	9/21/92	WATER
18384	RW-3	9/21/92	WATER
18385	RW-4	9/21/92	WATER
18386	RW-5*	9/21/92	WATER
18387	RW-6	9/21/92	WATER
18388	RW-7	9/21/92	WATER
18389	RW-8	9/21/92	WATER
18390	RB-1	9/21/92	WATER
18391	POOL-1	9/21/92	WATER
18392	BLANK	9/21/92	WATER
18453	RW-5*	9/23/92	WATER

* - Due to inexplicable hydrocarbon odor present in sample (18386) - Well #5 was resampled on 23 September 1992. No indication of hydrocarbon product was found in well before or after purging. It is felt that possible line contamination by well sealing material rendered previous sample contamination.

4. Laboratory Data

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Analyzed
A-18382	W-1	Sulfide	2.8	mg/L	10/06/92
A-18383	W-2	Sulfide	< 0.02	mg/L	10/06/92
A-18384	W-3	Sulfide	*		
A-18385	W-4	Sulfide	< 0.02	mg/L	10/06/92
A-18387	W-6	Sulfide	< 0.02	mg/L	10/06/92
A-18388	W-7	Sulfide	< 0.02	mg/L	10/06/92
A-18389	W-8	Sulfide	< 0.02	mg/L	10/06/92
A-18390	RB-1	Sulfide	< 0.02	mg/L	10/06/92
A-18391	POOL-1	Sulfide	< 0.02	mg/L	10/06/92
A-18453	RW-5	Sulfide	< 0.02	mg/L	10/06/92

* - Sample A-18384 was received broken at our contracted laboratory.

Reviewed By: _____, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION, ENVIRONMENTAL LABORATORY

PRODUCED ON 11/06/92
12:42

HOPKINTON WELLS

METHOD 376.2: SULFIDE (mg/L) - WATER

ENV NO.	SULFIDE	DATE ANALYZED
METHOD BLANK	< 0.02	10/6/92

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY November 5, 1992

Lab#	Field Description	Test	Result	Units
A-18382	W-1	Free Carbon Dioxide	33	mg CO2/L
A-18383	W-2	Free Carbon Dioxide	15	mg CO2/L
A-18384	W-3	Free Carbon Dioxide	9.1	mg CO2/L
A-18385	W-4	Free Carbon Dioxide	2.4	mg CO2/L
A-18387	W-6	Free Carbon Dioxide	4.4	mg CO2/L
A-18388	W-7	Free Carbon Dioxide	7.2	mg CO2/L
A-18389	W-8	Free Carbon Dioxide	14	mg CO2/L
A-18391	POOL-1	Free Carbon Dioxide	14	mg CO2/L
A-18453	RW-5	Free Carbon Dioxide	102	mg CO2/L

Reviewed By: _____, Analyst

Approved By: _____, Chief Chemist

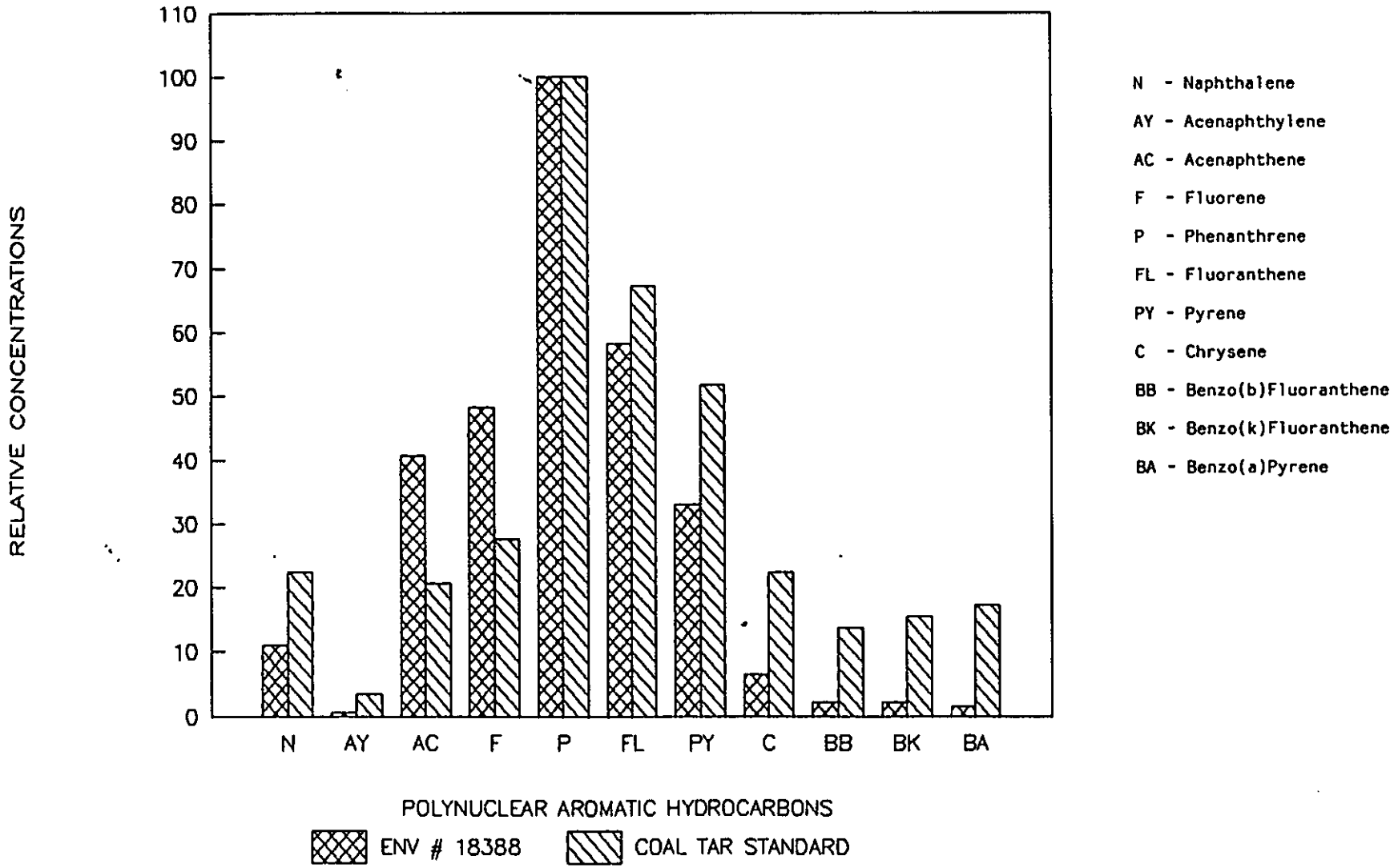
HOPKINTON WELLS

FUEL IDENTIFICATION - SAMPLE NUMBER 18388

GCMS analysis of Sample Number 18388 showed a very atypical PAH distribution. Specifically, the fused-ring aromatics are dominated by the pyrogenic PAHs phenanthrene, fluoranthene, and pyrene, with high parent/total homologous series. This finding is indicative of combustion - related products, specifically coal tar.

RELATIVE CONCENTRATIONS OF PREDOMINANT

POLYNUCLEAR AROMATIC HYDROCARBONS



U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY November 2, 1992

Lab#	Field Description	Test	Result	Units	Date Analyzed
A-18382	RW-1	Total Dissolved Solids	112	mg/L	09/29/92
A-18383	RW-2	Total Dissolved Solids	50	mg/L	09/29/92
A-18384	RW-3	Total Dissolved Solids	48	mg/L	09/29/92
A-18385	RW-4	Total Dissolved Solids	40	mg/L	09/29/92
A-18387	RW-6	Total Dissolved Solids	74	mg/L	09/29/92
A-18388	RW-7	Total Dissolved Solids	50	mg/L	09/29/92
A-18389	RW-8	Total Dissolved Solids	58	mg/L	09/29/92
A-18390	RB-1	Total Dissolved Solids	2.0	mg/L	09/29/92
A-18391	POOL-1	Total Dissolved Solids	38	mg/L	09/29/92
A-18453	RW-5	Total Dissolved Solids	86	mg/L	09/28/92

Reviewed By: _____, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION, ENVIRONMENTAL LABORATORY

PRODUCED ON 10/27/92 11:29

HOPKINTON WELLS

STANDARD METHOD 209C: TOTAL DISSOLVED SOLIDS (mg/L) - WATER

ENV NO.	TOTAL DISSOLVED SOLIDS	DATE ANALYZED
METHOD BLANK	< 1	9/28/92

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Analyzed
A-18382	W-1	pH	7.1		09/21/92
A-18383	W-2	pH	6.1		09/21/92
A-18384	W-3	pH	6.3		09/21/92
A-18385	W-4	pH	7.6		09/21/92
A-18387	W-6	pH	7.2		09/21/92
A-18388	W-7	pH	6.7		09/21/92
A-18389	W-8	pH	6.7		09/21/92
A-18391	POOL-1	pH	5.9		09/21/92
A-18453	RW-5	pH	6.5		09/23/92

Reviewed By: _____, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY November 5, 1992

Lab#	Field Description	Test	Result	Units	Date Analyzed
A-18382	RW-1	Alkalinity	52	mgCaCO3/L	09/23/92
A-18383	RW-2	Alkalinity	8.5	mgCaCO3/L	09/23/92
A-18384	RW-3	Alkalinity	6.4	mgCaCO3/L	09/23/92
A-18385	RW-4	Alkalinity	7.0	mgCaCO3/L	09/23/92
A-18387	RW-6	Alkalinity	8.0	mgCaCO3/L	09/23/92
A-18388	RW-7	Alkalinity	7.7	mgCaCO3/L	09/23/92
A-18389	RW-8	Alkalinity	15	mgCaCO3/L	09/23/92
A-18391	POOL-1	Alkalinity	11	mgCaCO3/L	09/23/92
A-18453	RW-5	Alkalinity	5.2	mgCaCO3/L	09/28/92

Reviewed By: _____, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY November 4, 1992

Lab#	Field Description	Test	Result	Units	Date Analyzed
A-18382	W-1	Chloride	13	mg/L	09/23/92
A-18383	W-2	Chloride	16	mg/L	09/23/92
A-18384	W-3	Chloride	15	mg/L	09/23/92
A-18385	W-4	Chloride	15	mg/L	09/23/92
A-18387	W-6	Chloride	15	mg/L	09/23/92
A-18388	W-7	Chloride	15	mg/L	09/23/92
A-18389	W-8	Chloride	21	mg/L	09/23/92
A-18390	RB-1	Chloride	< 0.40	mg/L	09/23/92
A-18391	POOL-1	Chloride	16	mg/L	09/23/92

Reviewed By: Paul V. Wolf for ANNE-MARIE LUPIEN, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION, ENVIRONMENTAL LABORATORY

PRODUCED ON 11/04/92
15:01

HOPKINTON WELLS

METHOD 300: Chloride (mg/L)

Env. No.		Chloride	Date Analyzed
Method Blank	<	0.40	9/23/92

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Analyzed
A-18453	RW-5	Chloride	17	mg/L	11/06/92

Reviewed By: _____, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION, ENVIRONMENTAL LABORATORY

PRODUCED ON 11/06/92
14:54

HOPKINTON WELLS

METHOD 300: Chloride (mg/L)

Env. No.	Chloride	Date Analyzed
Method Blank	< 0.40	11/6/92

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Analyzed
A-18382	W-1	Hardness	68	mg CaCO3/L	10/30/92
A-18383	W-2	Hardness	13	mg CaCO3/L	10/30/92
A-18384	W-3	Hardness	15	mg CaCO3/L	10/30/92
A-18385	W-4	Hardness	15	mg CaCO3/L	10/30/92
A-18387	W-6	Hardness	15	mg CaCO3/L	10/30/92
A-18388	W-7	Hardness	17	mg CaCO3/L	10/30/92
A-18389	W-8	Hardness	24	mg CaCO3/L	10/30/92
A-18390	RB-1	Hardness	< 0.44	mg CaCO3/L	10/30/92
A-18391	POOL-1	Hardness	37	mg CaCO3/L	10/30/92
A-18453	RW-5	Hardness	16	mg CaCO3/L	10/30/92

Reviewed By: Paul V. Watts, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION, ENVIRONMENTAL LABORATORY

PRODUCED ON 11/06/92
10:58

HOPKINTON WELLS

STANDARD METHOD 2340B: HARDNESS (mg CaCO3/L)

ENV NO.	HARDNESS	DATE ANALYZED
METHOD BLANK	< 0.44	10/30/92

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18382	W-1	Calcium - Total	19	ug/mL	10/23/92	10/30/92
		Iron - Total	12	ug/mL	10/23/92	10/30/92
		Magnesium - Total	5.3	ug/mL	10/23/92	10/30/92
		Manganese - Total	0.29	ug/mL	10/23/92	10/30/92

Reviewed By: Paul V. West, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18383	W-2	Calcium - Total	3.9	ug/mL	10/23/92	10/30/92
		Iron - Total	1.0	ug/mL	10/23/92	10/30/92
		Magnesium - Total	0.87	ug/mL	10/23/92	10/30/92
		Manganese - Total	0.021	ug/mL	10/23/92	10/30/92

Reviewed By: Paul V. West, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18384	W-3	Calcium - Total	4.4	ug/mL	10/23/92	10/30/92
		Iron - Total	11	ug/mL	10/23/92	10/30/92
		Magnesium - Total	1.0	ug/mL	10/23/92	10/30/92
		Manganese - Total	0.79	ug/mL	10/23/92	10/30/92

Reviewed By: Paul V. West, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18385	W-4	Calcium - Total	4.5	ug/mL	10/23/92	10/30/92
		Iron - Total	1.8	ug/mL	10/23/92	10/30/92
		Magnesium - Total	1.0	ug/mL	10/23/92	10/30/92
		Manganese - Total	0.13	ug/mL	10/23/92	10/30/92

Reviewed By: _____, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18387	W-6	Calcium - Total	4.3	ug/mL	10/23/92	10/30/92
		Iron - Total	1.0	ug/mL	10/23/92	10/30/92
		Magnesium - Total	0.98	ug/mL	10/23/92	10/30/92
		Manganese - Total	0.093	ug/mL	10/23/92	10/30/92

Reviewed By: Paul V. Wiest, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18388	W-7	Calcium - Total	5.1	ug/mL	10/23/92	10/30/92
		Iron - Total	9.6	ug/mL	10/23/92	10/30/92
		Magnesium - Total	1.1	ug/mL	10/23/92	10/30/92
		Manganese - Total	0.38	ug/mL	10/23/92	10/30/92

Reviewed By: Paul T. Wells, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18389	W-8	Calcium - Total	7.0	ug/mL	10/23/92	10/30/92
		Iron - Total	2.9	ug/mL	10/23/92	10/30/92
		Magnesium - Total	1.7	ug/mL	10/23/92	10/30/92
		Manganese - Total	1.1	ug/mL	10/23/92	10/30/92

Reviewed By: Paul T. West, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18390	RB-1	Calcium - Total	0.11	ug/mL	10/23/92	10/30/92
		Iron - Total	0.10	ug/mL	10/23/92	10/30/92
		Magnesium - Total	< 0.050	ug/mL	10/23/92	10/30/92
		Manganese - Total	< 0.0020	ug/mL	10/23/92	10/30/92

Reviewed By: Paul V. Wyatt, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18391	POOL-1	Calcium - Total	9.6	ug/mL	10/23/92	10/30/92
		Iron - Total	26	ug/mL	10/23/92	10/30/92
		Magnesium - Total	3.1	ug/mL	10/23/92	10/30/92
		Manganese - Total	11	ug/mL	10/23/92	10/30/92

Reviewed By: Paul T. Wiatt, Analyst

Approved By: _____, Chief Chemist

U.S. ARMY CORPS OF ENGINEERS - ENVIRONMENTAL LABORATORY

- TRACE METALS RESULTS

November 6, 1992

Lab#	Field Description	Test	Result	Units	Date Digested	Date Analyzed
A-18453	RW-5	Calcium - Total	4.7	ug/mL	10/23/92	10/30/92
		Iron - Total	8.6	ug/mL	10/23/92	10/30/92
		Magnesium - Total	0.17	ug/mL	10/23/92	10/30/92
		Manganese - Total	0.97	ug/mL	10/23/92	10/30/92

Reviewed By: Paul V. West, Analyst

Approved By: _____, Chief Chemist

U. S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION, ENVIRONMENTAL LABORATORY

PRODUCED ON 11/06/92
12:48

HOPKINTON DAM

TRACE METAL RESULTS - WATER (ppm)

PARAMETER	METHOD BLANK
Calcium	0.066
Iron	0.018
Magnesium	< 0.050
Manganese	< 0.0020

SAMPLE DATE:
DATE DIGESTED: 10/23/92
DATE ANALYZED: 10/30/92

5. Quality Assurance Data

SULFIDE
ANALYSIS OF STANDARD REFERENCE MATERIAL
EPA STANDARD
ACCURACY

PARAMETER CONTRACTOR DATA	REPORT VALUE (mg/L)	TRUE VALUE (mg/L)	SULFIDE RECOVERY (%)	ACCEPTABLE RANGE (%)	IN OR OUT OF ACCEPTABLE RANGE
Sulfide	0.060	0.061	98.4	80 - 120	IN

HOPKINTON WELLS
TOTAL DISSOLVED SOLIDS
PRECISION

ENV / FIELD NO.	SAMPLE RESULT (mg/L)	SAMPLE REPLICATE RESULT (mg/L)	RELATIVE PERCENT DEVIATION (RPD)	RPD MAXIMUM	IN/ OUT
DATE ANALYZED: 9/29/92					
18391	38	46	19	66	IN

HOPKINTON WELLS
TOTAL DISSOLVED SOLIDS
PRECISION

ENV / FIELD NO.	SAMPLE RESULT (mg/L)	SAMPLE REPLICATE RESULT (mg/L)	RELATIVE PERCENT DEVIATION (RPD)	RPD MAXIMUM	IN/ OUT
DATE ANALYZED: 9/28/92					
LABORATORY SAMPLE	476	472	1	66	IN

HOPKINTON WELLS
ALKALINITY
PRECISION

ENV / FIELD NO.	SAMPLE RESULT	SAMPLE REPLICATE RESULT	RELATIVE PERCENT DEVIATION	RPD MAXIMUM	IN/ OUT
DATE ANALYZED: 9/23/92	(mg CaCO3/L)	(mg CaCO3/L)	(RPD)		
LABORATORY SAMPLE	11	9.7	15	66	IN

BLANK SPIKE
CHLORIDE
WATER
ACCURACY

COMPOUND	BLANK SPIKE RESULT	BLANK RESULT	SPIKE ADDED	SPIKE RECOVERY %	CONTROL LIMITS REC	IN OR OUT OF QC LIMITS
DATE ANALYZED: 9/23/92						
Chloride	4.7	< 0.40	5.0	94	75 - 125	IN

BLANK SPIKE
CHLORIDE
WATER
ACCURACY

COMPOUND	BLANK SPIKE RESULT	BLANK RESULT	SPIKE ADDED	SPIKE RECOVERY %	CONTROL LIMITS REC	IN OR OUT OF QC LIMITS
DATE ANALYZED: 11/6/92						
Chloride	5.2	< 0.40	5.0	104	75 - 125	IN

HARDNESS
BLANK SPIKE/BLANK SPIKE DUPLICATE
WATER
PRECISION

COMPOUND	BLANK SPIKE RECOVERY (%)	BLANK SPIKE DUPLICATE RECOVERY (%)	RELATIVE PERCENT DEVIATION (RPD)	RPD MAXIMUM	IN OR OUT OF QC LIMITS
DATE DIGESTED: 10/30/92					
Hardness	106	105	1	66	IN

ACCURACY

COMPOUND	BLANK SPIKE RESULT	BLANK RESULT	SPIKE ADDED	SPIKE RECOVERY %	CONTROL LIMITS REC	IN OR OUT OF QC LIMITS
Hardness	70	< 0.44	66	106	50 - 150	IN

TRACE METAL ANALYSIS
ICAP METALS
BLANK SPIKE/BLANK SPIKE DUPLICATE
WATER
PRECISION

PARAMETER 10/23/92	BLANK SPIKE RECOVERY (%)	BLANK SPIKE DUPLICATE RECOVERY (%)	RELATIVE PERCENT DEVIATION (RPD)	MAXIMUM ACCEPTABLE RPD	IN OR OUT OF QC LIMITS
Calcium	105	104	1	30	IN
Iron	108	106	2	30	IN
Magnesium	106	106	0	30	IN
Managanese	103	104	1	30	IN

TRACE METAL ANALYSIS
ICAP METALS
BLANK SPIKE/BLANK SPIKE DUPLICATE
WATER
ACCURACY

PARAMETER 10/23/92	BLANK SPIKE RESULT	BLANK RESULT	SPIKE ADDED	SPIKE RECOVERY %	CONTROL LIMITS REC	IN OR OUT OF QC LIMITS
Calcium	11	0.066	10	105	75 - 125	IN
Iron	1.1	0.018	1.0	108	75 - 125	IN
Magnesium	11	< 0.050	10	106	75 - 125	IN
Manganese	1.0	< 0.0020	1.0	103	75 - 125	IN

6. Chain of Custody

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

A B C D E F G H

PROJ. NO. | PROJECT NAME: Hopkinton Wells

SAMPLERS: *(Signature)*

ENV ~~OTA~~. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Sulfide	T.DS	Anions (chloride only)	ALK	CO_2	Trace Metals	Hardness	Temperature	~~TPH~~ BTEX	Petroleum I.D.	REMARKS
18382	21 Sept 92	1456		✓	W-1	5	✓	✓	✓	✓	✓	✓	✓				
18383		1414		✓	W-2		✓	✓	✓	✓	✓	✓	✓				
18384		1357		✓	W-3		✓	✓	✓	✓	✓	✓	✓				
18385		1339		✓	W-4		✓	✓	✓	✓	✓	✓	✓				
18386		1140		✓	W-5	6	✓	✓	✓	✓	✓	✓	✓		✓		~~Metals~~
18387		~~1159~~ 1259		✓	W-6	5	✓	✓	✓	✓	✓	✓	✓				
18388		1048		✓	W-7	6	✓	✓	✓	✓	✓	✓	✓		✓	✓	
18389		~~1099~~ 1059		✓	W-8	5	✓	✓	✓	✓	✓	✓	✓				
18390		~~1505~~ 1159		✓	RB-1		✓	✓	✓	✓	✓	✓	✓				
18391		1259		✓	Pond-1	✓	✓	✓	✓	✓	✓	✓	✓				
18392	↓	0700		✓	BLANK	1							✓				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Nancy L. Snider	22 Sept 92 0730	Sheila Snyder			
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks: Trace Metals: IRON, Calcium and manganese.	

Distribution: Original Accompanies Shipment; Copy 1 to Sample Custodian; Copy 2 to Coordinator Field Files

0814

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
	Hopkinton Wells

SAMPLERS: *(Signature)* Nancy L. Cominiden, [illegible]

ENV ~~STA.~~ NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	Sulfide (A)	Trace metals (B)	Hardness (B)	Chloride (C)	Alk + CO2 (D)	TDS (E)	REMARKS
18453	23 Sept 92	1044		✓	RW-5	5	✓	✓	✓	✓	✓	✓	H_2O

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Nancy L. Cominiden	23 Sept / 1325	Sheila E. Snyder			
Relinquished by: *(Signature)*	**Date / Time**	**Received by:** *(Signature)*	**Relinquished by:** *(Signature)*	**Date / Time**	**Received by:** *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks

Distribution: Original Accompanies Shipment; Copy 1 to Sample Custodian; Copy 2 to Coordinator Field Files

3140

7. Cooler Receipt Form

CENED-ED-GL-E
SAMPLE CONTAINER RECEIPT FORM

PROJECT: HOPKINTON WELLS

Container received on 9-22-92 and opened on 9-22-92 by: SHEILA SNYDER
Sheila Snyder

1. Shipper (USM, UPS, DHL, FEDEX, P/C, AIR EXP (HAND-DELIVERED))
2. Container type ((Cooler) box, envelope, etc.) _____
3. Were custody seals on outside of container? (N/A) Yes No
   How many & where: _____, seal date: _____, seal name: _____
4. Were custody papers taped to lid inside container? (N/A) Yes No
5. Custody papers properly filled out? (ink, signed, etc.) (Yes) No
6. Was project identifiable from custody papers? (Yes) No
7. Did you sign custody papers in appropriate place? (Yes) No
8. Did you attach shipper's packing form to this form? (N/A) Yes No
9. Packing material (peanuts, vermiculite, bubble wrap, paper, cans, other) Non
10. Was sufficient ice used? Temperature 4 °C N/A (Yes) No
11. Were all samples sealed in separate plastic bags? (N/A) Yes No
12. Did all samples arrive in good condition? (Yes) No
13. Sample labels complete? (#, date, analysis, preservation, sign.) (Yes) No
14. Did all sample labels agree with custody papers? (Yes) No
15. Were correct sample containers used for tests indicated? N/A (Yes) No
16. Were correct preservatives used? (TM pH_____, CN- pH_____) N/A Yes No
17. Were VOA vials bubble-free (H_2O) or no headspace (soil)? (N/A) Yes No
18. Was sufficient amount of sample sent in each container? (Yes) No
19. Were air volumes noted for air samples? (N/A) Yes No
20. Were initial weights noted for pre-weighed filters? (N/A) Yes No

Discrepancies: _____

CENED-ED-GL-E

SAMPLE CONTAINER RECEIPT FORM

PROJECT: HOPKINTON WELLS

Container received on 9.23.92 and opened on 9.23.92 by: SHEILA SNYDER
Sheila Snyder

1. Shipper (USM, UPS, DHL, FEDEX, P/C, AIR EXP, (HAND-DELIVERED))
2. Container type ((Cooler), box, envelope, etc.) _____
3. Were custody seals on outside of container? (N/A) Yes No
   How many & where: _____, seal date: _____, seal name: _____
4. Were custody papers taped to lid inside container? (N/A) Yes No
5. Custody papers properly filled out? (ink, signed, etc.) (Yes) No
6. Was project identifiable from custody papers? (Yes) No
7. Did you sign custody papers in appropriate place? (Yes) No
8. Did you attach shipper's packing form to this form? (N/A) Yes No
9. Packing material (peanuts, vermiculite, bubble wrap, paper, cans, other) None
10. Was sufficient ice used? Temperature ____ °C N/A (Yes) No
11. Were all samples sealed in separate plastic bags? (N/A) Yes No
12. Did all samples arrive in good condition? (Yes) No
13. Sample labels complete? (#, date, analysis, preservation, sign.) (Yes) No
14. Did all sample labels agree with custody papers? (Yes) No
15. Were correct sample containers used for tests indicated? N/A (Yes) No
16. Were correct preservatives used? (TM pH 1, CN- pH _____) N/A (Yes) No
17. Were VOA vials bubble-free (H_2O) or no headspace (soil)? (N/A) Yes No
18. Was sufficient amount of sample sent in each container? (Yes) No
19. Were air volumes noted for air samples? (N/A) Yes No
20. Were initial weights noted for pre-weighed filters? (N/A) Yes No

Discrepancies: _____

8. Quality Assurance Review

Quality Assurance Review

Project: Hopkinton Wells

Date: 16 November 1992

A. Sample Handling

The samples were collected by NED Environmental Laboratory personnel using standardized procedures. The appropriate sample containers and preservation techniques were used. Proper chain-of-custody procedures were followed.

B. Laboratory Analysis

1. Holding Times:

The maximum holding times between sample collection and analysis were met for metals, fluoride, pH, hardness, chloride, and alkalinity. The holding time for free CO2 was also met since the alkalinity and pH data used to calculate it were generated within the maximum holding times. The seven day holding time for total dissolved solids was met for sample no. 18453. It was exceeded by one day for the other samples which is not important. The seven day maximum holding time for sulfide was exceeded by six days for sample no. 18453 and by eight days for the rest of the samples. This will not be significant as the samples were properly preserved and refrigerated in the time period between sample collection and analysis. One of the samples sent for sulfide arrived broken at the contract laboratory. A repeat sample was not supplied.

2. Method Blanks:

The method blanks for sulfide, total dissolved solids, and chloride were free from contamination. The hardness blank resulted in a concentration of 0.44 ppm, but it is too low to be of any consequence. Some very low concentrations of calcium and iron were found in the metals blanks. This will result in some positive bias, but it will not be a problem as the sample concentrations were very low to begin with. We have identified the sources of this contamination and have taken corrective action.

3. Methodology:

Standard EPA procedures were used to analyze the metals, sulfide, pH, and chloride. Procedures from "Standard Methods" were applied to carbon dioxide, total dissolved solids, alkalinity, and hardness. Fuel identification was performed according to a proposed ASTM procedure with reference to the publication "Contaminated Soils - Diesel Fuel Contamination", Kostecki and Calabrese. This methodology was used because of a very fast turn around time for the data. This is acceptable because only qualitative results were requested.

4. QA/QC Data:

The replicate analyses for fluoride, total dissolved solids, and alkalinity were all in control. The blank spikes and blank spike duplicates for hardness and the metals were all in control for both accuracy and precision. The blank spikes run for chloride were in control for accuracy as well as the EPA reference material run for sulfide by the contractor. To summarize, excellent precision and accuracy were demonstrated.

Forrest E. Knowles, Jr.
Quality Assurance Officer -
Laboratory Testing
Operations